

PAST AND PRESENT DISTRIBUTION IN AUSTRALIA OF THE GASTEROPOD *TYLOSPIRA*

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Figure 1.

Summary: The family Struthiolariidae is represented in Australia by *Tylospira* (*Tylospira*) and *Tylospira* (*Singletonaria*). Their geological history from the Miocene to the present is clarified. The only living representative is *Tylospira* (*T.*) *scutulata*, which is the type species of the genus.

Introduction: Shells of the marine snail *Tylospira scutulata* (Martyn) are commonly washed up on New South Wales beaches, but the species is not found alive because it belongs to the deeper water offshore. The shell is a smooth, turreted, strong skeleton of light fawn colour with an unusually shaped aperture and a claw-shaped operculum (Allan, 1950, p. 96). This is the only living species of *Tylospira*. The genus belongs to the family Struthiolariidae, which is limited to Australia, New Zealand, and South America, and ranges in time from the Mesozoic to the present. The Australian branch of the family consists only of the genus *Tylospira* (as now defined), which ranges in time from the Miocene to the present. In the seas of the past, *Tylospira* was often present in great numbers of individuals, but it apparently did not proliferate into numerous species.

UNUSUAL HABIT OF ADULT GROWTH

In most of its species, *Tylospira* is remarkable for its unusual adult growth, and indeed this is why Harris (1897) so named it. *Tylos* is Greek for a callosity, so *Tylospira* means the calloused spire. Dr. J. Marwick of New Zealand, who has made a study of the Struthiolariidae (Marwick 1950), describes the growth of *Tylospira* thus: "When the shell is about half-grown, the outer-lip is slightly reflexed and a moderate coating of callus is deposited on the convex edge. The callus extends adapically, parietally and basally, but it remains thin all over the inner lip so formed. The shell then continues to grow by increments of the glazed callus on the edge of the outer-lip and the end of the columella. Owing to some change in the part of the mantle that produces the surface sculpture, well-defined spiral cords and axial shoulder tubercles are no longer formed, weak spiral cords and cingula and low irregular, sinuous growth ridges taking their place. In *T. scutulata* this kind of growth goes on for about two whorls" (Marwick, 1960). This peculiar process of growth can be deciphered from some of the weathered specimens in which the various layers of shell substance become apparent.

FOSSIL RECORD

The fossil shell nearest to the living *Tylospira scutulata* (and so probably its direct ancestor) is *T. coronata* (Tate, 1888), which is common in the Lower Pliocene (Kallimnan) beds of the Gippsland Lakes district, in beds of the same age along Muddy Creek and Grange Burn, four miles west of Hamilton (Gill, 1957), and in similar beds on Spring Creek east of Minhamite railway station, 25 miles S.E. of Hamilton. Tate also recorded it from a well-sinking in the Murray desert. *Tylospira coronata* also occurs in Upper Miocene (Cheltenhamian) beds outcropping in the seaside cliffs at Beaumaris, and in other beds of the same age.

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The record of this species from still older rocks is apparently an error. For example, Dennant and Kitson (1903) listed *T. coronata* as appearing in the Upper Oligocene beds at Table Cape (= Fossil Bluff, Wynyard) in northern Tasmania. The shell on which this record is based was found in Dennant's collection in the National Museum of Victoria. Some of the matrix was extracted from inside the specimen and sent to Mr. A. C. Collins for foraminiferal examination. He did not find many foraminifera, and most of them were juvenile rotaliids, but one referable to *Parrellina verriculata* was found, and this species ranges from the Miocene of Muddy Creek near Hamilton to the present day waters of Bass Strait. The species is not known to occur at Table Cape, nor has anyone definitely found *Tylospira* in rocks older than Upper Miocene.

Tylospira clathrata is a second fossil species of this genus that was also described by Professor Tate. This species has been recorded from many localities, but Mr. R. W. T. Wilkins, after a careful study of the matter, states that it is to be found only at Rosehill farm on the Mitchell River, Gippsland, and its stratigraphical equivalents. This statement has been checked by the collections in the National Museum of Victoria and found to be correct. Mr. Wilkins has recently shown that the beds at Rosehill farm are slightly older than Cheltenhamian. Thus the occurrences of *T. coronata* and *T. clathrata* are mutually exclusive. *T. clathrata* is only reported from the one locality, and it is older than all the proved occurrences of *coronata*. It is very helpful for stratigraphic purposes to have all these occurrences clarified.

The three species of *Tylospira* mentioned so far (*scutulata*, *coronata*, *clathrata*) all belong to the subgenus *T. (Tylospira)*. to the second subgenus *T. (Singletonaria)* belongs *T. (Singletonaria) lirata* (Marwick, 1952), which is known only from the Upper Miocene (Cheltenhamian) of the Lakes Entrance district of Victoria.

STRANGE SHELL FROM FLINDERS ISLAND

When the soil survey of Flinders Island in Bass Strait was being carried out, Mr. G. M. Dimmock collected a number of fossil shells and sent them to the author for identification. Among these was a strange shell that looked like *Singletonaria* but had a *Tylospira* callus. This shell was sent to Dr. J. Marwick, who decided that as this new species fits in between *Singletonaria* and *Tylospira*, it would be better to reduce his genus *Singletonaria* to a subgenus, and called the new shell *Tylospira (Singletonaria) gilli* (Marwick, 1952, 1960). Its age is probably Middle Pliocene (Gill, 1962).

Thus the history of *Tylospira* can now be traced in the rocks of Australia as follows:

Period	Subgenus <i>Tylospira</i>	Subgenus <i>Singletonaria</i>
Quaternary	<i>scutulata</i>	extinct
Pliocene	<i>coronata</i>	<i>gilli</i>
Miocene	<i>coronata</i>	<i>lirata</i>
	<i>clathrata</i>	

ECOLOGY OF *TYLOSPIRA*

Tylospira is a warm temperate mollusc, and is not found alive in Victoria at present, but in the past it thrived as far south as Flinders Island in Tasmania. There is evidence that the climate in S.-E. Australia was then warmer (Parr 1939, Gill 1961) than at present. Text-figure 1 shows this change of latitude with time, and the known distribution of all the described species of *Tylospira*. This genus has ecological limitations in addition to temperature, as is shown by the fact that large numbers are present at a given locality, but as the fossil bed containing them is traced across country the *Tylospira* species disappears. There is much to be learnt yet about the ecology of both the living and fossil species of *Tylospira*.

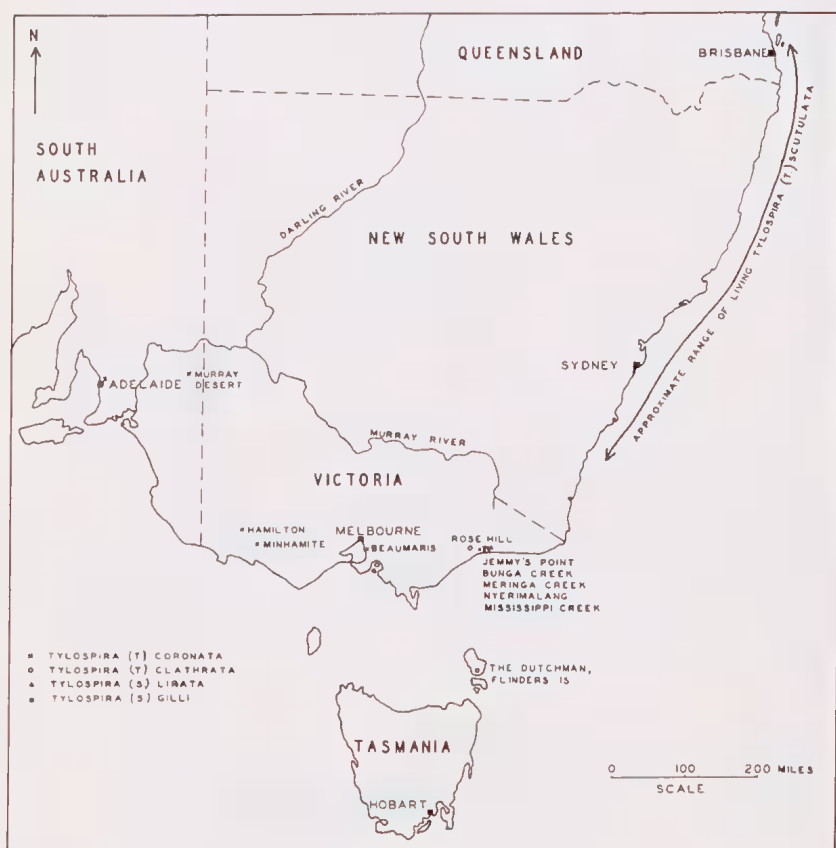


Figure 1.

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AN OUTLINE OF THE DEVELOPMENT OF THE BIVALVE GASTROPOD *MIDORIGAI AUSTRALIS* BURN, 1960

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Figure 1.

Summary: Specimens of *Midorigai australis* collected in Port Hacking, Sydney, and measuring less than 1.0 mm. in shell length laid two egg masses in the laboratory. Each egg mass contained 50 ± 2 eggs which developed along typically gastropod lines to hatch on the 11-13th day. Paired statocysts, eyespots, and velar lobes were readily visible in the free swimming veliger. An operculum was present. The protoconch measured 116-118 μ in diameter and was brownish and transparent, except for the straight, posterior edge of the opening. The latter was dark brown. Evidently the development of the paired valves and associated musculature takes place later in the life history.

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